REMARKS

Claims 1-52 are pending in this application. By this Amendment, claim 2 is amended. No new matter is added.

The Office Action rejects claims 1-52 under 35 U.S.C. §102(b) as being anticipated by US 913 (U.S. Patent No. 6,332,913 to Breitschwerdt et al.). Applicants respectfully traverse the rejection.

A. Claims 1-22

Independent claim 1 recites:

> A hydrogen generator that generates hydrogen from a predetermined material, said hydrogen generator comprising:
> a porous gaseous mixture layer through which a gaseous mixture including hydrogen passes;
> a hydrogen separation layer that allows only the hydrogen to selectively permeate therethrough for separation of the hydrogen; and
> a porous hydrogen extraction layer through which a hydrogen rich gas passes, the hydrogen rich gas mainly containing the hydrogen selectively permeating the hydrogen separation layer,
> wherein the respective layers form a laminate structure, in which the hydrogen separation layer is interposed between the gaseous mixture layer and the hydrogen extraction layer.

Claims 2-22 depend from claim 1 and include all of its limitations. US 913 fails to teach at least the porous gaseous mixture layer and the porous hydrogen extraction layer of claim 1.

US 913 discloses a membrane module for selective gas separation that includes one or more separation units stacked on one another, and at least one of interposed frame plates were stack-end frame plates. See US 913 at the Abstract. Citing to Fig. 1 of US 913, the Office Action argues that metal membrane 7 corresponds to the claimed hydrogen separation layer, parallel grooves 5 correspond to the claimed porous hydrogen extraction layer, and chambers 15, 16, and 19 correspond to the claimed porous gaseous mixture layer.

However, US 913's chambers 15, 16, and 19 are hollow chambers, and are clearly not porous. See col. 3, line 64 – col. 4, line 37 of US 913. Thus, US 913's chambers 5 do not satisfy the limitation porous gas mixture layer of claim 1. Similarly, US 913's parallel grooves 5 are hollow grooves, and are clearly not porous. See col. 3, lines 31-35. Thus, US 913's parallel grooves 5 do not satisfy the limitation porous hydrogen extraction layer of claim 1. Accordingly, US 913 fails to teach every feature of claim 1.

For at least the reason discussed above, claim 1 is not anticipated by US 913. Because claims 2-22 depend from claim 1 and include all of its features, these dependent claims are also not anticipated by US 913, for at least the same reasons as claim 41. Reconsideration and withdrawal of the rejection are respectfully requested.

B. Claims 23-45

Claim 23 is directed to:

> A hydrogen generator that generates hydrogen from a predetermined material, said hydrogen generator comprising:
> a porous gaseous mixture layer through which a gaseous mixture including hydrogen passes;
> a hydrogen separation layer that allows only the hydrogen to selectively permeate therethrough for separation of the hydrogen; and
> a hydrogen extraction layer through which a hydrogen rich gas passes, the hydrogen rich gas mainly containing the hydrogen selectively permeating the hydrogen separation layer,
> wherein the respective layers form a laminate structure, in which a gas inlet into the gaseous mixture layer, a gas outlet from the gaseous mixture layer, a gas inlet into the hydrogen extraction layer, and a gas outlet from the hydrogen extraction layer are arranged in predetermined directions in preset side faces of the laminate structure, and the hydrogen separation layer is interposed between the gaseous mixture layer and the hydrogen extraction layer.

Claims 24-45 depend from claim 23 and include all of its features. For the reasons discussed above in Section A, US 913 fails to teach the porous gaseous mixture layer and the hydrogen extraction layer of claim 23.

In addition, US 913 fails to teach the limitation wherein the respective layers form a laminate structure, in which a gas inlet into the gaseous mixture layer, a gas outlet from the gaseous mixture layer, a gas inlet into the hydrogen extraction layer, and a gas outlet from the hydrogen extraction layer are arranged in predetermined directions in preset side faces of the laminate structure of claim 23.

Referring to Figs. 1 and 2, US 913 discloses gas mixture connection openings 22 and 23 leading to chambers 15 and 16, and slot-like hydrogen connection openings 10 and 11 forming hydrogen connection passages 12 and 13. See US 913 at col. 3, lines 41-63 and col. 4, lines 21-37. However, US 913 is silent regarding a gas inlet into the gaseous mixture layer, a gas outlet from the gaseous mixture layer, a gas inlet into the hydrogen extraction layer, and a gas outlet from the hydrogen extraction layer arranged in predetermined directions in preset side faces of the laminate structure, as required by claim 23. Accordingly, US 913 fails to teach every feature of claim 23.

For at least the reasons discussed above, claim 23 is not anticipated by US 913. Because claims 24-45 depend from claim 23 and include all of its features, these dependent claims are also not anticipated by US 913, for at least the same reasons as claim 23. Reconsideration and withdrawal of the rejection are respectfully requested.

C. Claims 46-52

Claim 46 recites:

> A hydrogen generator that generates hydrogen from a predetermined material, said hydrogen generator comprising:
> a gaseous mixture layer through which a gaseous mixture including hydrogen passes;
> a hydrogen separation layer that allows only the hydrogen to selectively permeate therethrough for separation of the hydrogen; and
> a hydrogen extraction layer through which a hydrogen rich gas passes, the hydrogen rich gas mainly containing the hydrogen selectively permeating the hydrogen separation layer,

> wherein each of the gaseous mixture layer and the hydrogen extraction layer comprises a metal frame having a gas inlet and a gas outlet on side faces thereof, and the respective layers form a laminate structure by joining the metal frames with each other in such a manner that the hydrogen separation layer is interposed between the gaseous mixture layer and the hydrogen extraction layer.

Claims 47-52 depend from claim 46, and include all of its features. US 913 is discussed above.

US 913 fails to teach the limitation wherein each of the gaseous mixture layer and the hydrogen extraction layer comprises a metal frame having a gas inlet and a gas outlet on side faces thereof of claim 46. US 913 is silent regarding a porous gaseous mixture layer, a porous hydrogen extraction layer, a porous gaseous mixture layer comprising a metal frame having a gas inlet and a gas outlet on side faces thereof, and a porous hydrogen extraction layer comprising a metal frame having a gas inlet and a gas outlet on side faces thereof. Accordingly, US 913 fails to teach every feature of claim 46.

For at least the reasons discussed above, claim 46 is not anticipated by US 913. Because claims 47-52 depend from claim 46 and include all of its features, these dependent claims are also not anticipated by US 913, for at least the same reasons as claim 46. Reconsideration and withdrawal of the rejection are respectfully requested.

D. Conclusion

In view of the foregoing, it is respectfully submitted that this application is in condition for allowance. Favorable reconsideration and prompt allowance of claims 1-52 are earnestly solicited.

Should the Examiner believe that anything further would be desirable in order to place this application in even better condition for allowance, the Examiner is invited to contact the undersigned at the telephone number set forth below.

Respectfully submitted,

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Date: June 20, 2005

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